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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/613,955 | 07/07/2003 | Slawomir Rubinsztajn | 130129 | 6777 |

7590 02/28/2005

General Electric Company
CRD Patent Docket Rm 4A59
Bldg. K-1
P.O. Box 8
Schenectady, NY 12301

EXAMINER

FEELY, MICHAEL J

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| ART UNIT | PAPER NUMBER |
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1712

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,955

Applicant(s)

RUBINSZTAJN ET AL.

Examiner

Michael J. Feely

Art Unit

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 and 34 is/are allowed.
- 6) ☒ Claim(s) 1-11, 14-16, 18-28 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 12, 13, 29 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0703,0105.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 2, 3, 5, 6, 8, 10, 11, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Crivello (US 6,210,790).

Regarding claims 1, 2, 3, 5, 6, 8, 10, 11, and 15, Crivello discloses (1) a curable epoxy formulation comprising at least one epoxy monomer (Abstract; column 6, lines 4-31), at least one organofunctionalized colloidal silica (Abstract; column 3, line 59 through column 5, line 19),

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at least one alkyl onium cure catalyst (Abstract; column 6, line 61 through column 7, line 13), and optional reagents (column 7, lines 31-40);

(2) wherein the organofunctional colloidal silica comprises up to about 80 weight% of silicon dioxide, based on the total weight of the total curable epoxy formulation (Abstract; Examples);

(3) wherein the colloidal silica is functionalized with an organoalkoxysilane (column 3, line 59 through column 5, line 19);

(5) wherein the colloidal silica is further treated with an acid, basic, or ion exchange resin (column 5, lines 20-46); (6) wherein the colloidal silica is treated with a basic resin (column 5, lines 20-46);

(8) further comprising an organic diluent (column 7, lines 31-40);

(10) wherein the epoxy monomer comprises cycloaliphatic epoxy monomer, an aliphatic epoxy monomer, an aromatic epoxy monomer, a silicone epoxy monomer, or combinations thereof (column 6, lines 4-31);

(11) wherein the alkyl onium cure catalyst comprises an alkyl sulfonium cure catalyst (column 6, line 61 through column 7, line 13); and

(15) wherein the optional reagents comprise anti-oxidants, mold releasing additives, plasticizing additives, or combinations thereof (column 7, lines 31-40).

3. Claims 1-11, 14, 18-28, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Campbell et al. (Pub. No. US 2004/0102529 A1).

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Regarding claims 1-11 and 14, Campbell et al. disclose: *(1)* a curable epoxy formulation comprising at least one epoxy monomer (paragraphs 0006 and 0012-0024), at least one organofunctionalized colloidal silica (paragraphs 0006 and 0025-0029), at least one onium cure catalyst (paragraphs 0006 and 0032), and optional reagents (paragraphs 0006 and 0033-0045);

(2) wherein the organofunctional colloidal silica comprises up to about 80 weight % of a silicon dioxide, based on the total weight of the total curable epoxy formulation (paragraph 0025);

(3) wherein the colloidal silica is functionalized with an organoalkoxysilane (paragraphs 0025-0028); *(4)* wherein the organoalkoxysilane comprises phenyltrimethoxysilane (paragraph 0027); *(5)* wherein the colloidal silica is further treated with an acid, basic, or ion exchange resin (paragraphs 0028-0029); *(6)* wherein the colloidal silica is treated with a basic resin (paragraph 0029; column 7: Table 4); *(7)* wherein the basic resin comprises crosslinked polyvinylpyridine (paragraph 0029; column 7: Table 4);

(8) further comprising at least one organic diluent (paragraph 0043); *(9)* wherein the organic diluent comprises 3-ethyl-3-hydroxymethyl-oxetane (paragraph 0043);

(10) wherein the epoxy monomer comprises a cycloaliphatic epoxy monomer, an aliphatic epoxy monomer, an aromatic epoxy monomer, a silicone epoxy monomer or combinations thereof (paragraphs 0013-0024);

(11) wherein the alkyl onium cure catalyst comprises an alkyl sulfonium cure catalyst (paragraph 0032); and

(14) wherein the cured formulation provided a coefficient of thermal expansion of below about 70 pm/°C (paragraph 0012).

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Regarding claims 18-28, and 31, Campbell et al. disclose: **(18)** a solid state device comprising an encapsulant (paragraphs 0012 and 0048-0049), wherein said encapsulant comprises at least one epoxy monomer (paragraphs 0006 and 0012-0024), at least one organofunctionalized colloidal silica (paragraphs 0006 and 0025-0029), at least one onium cure catalyst (paragraphs 0006 and 0032), and optional reagents (paragraphs 0006 and 0033-0045);

(19) wherein the organofunctional colloidal silica comprises up to about 80 weight % of a silicon dioxide, based on the total weight of the total curable epoxy formulation (paragraph 0025);

(20) wherein the colloidal silica is functionalized with an organoalkoxysilane (paragraphs 0025-0028); **(21)** wherein the organoalkoxysilane comprises phenyltrimethoxysilane (paragraph 0027); **(22)** wherein the colloidal silica is further treated with an acid, basic, or ion exchange resin (paragraphs 0028-0029); **(23)** wherein the colloidal silica is treated with a basic resin (paragraph 0029; column 7: Table 4); **(24)** wherein the basic resin comprises crosslinked polyvinylpyridine (paragraph 0029; column 7: Table 4);

(25) further comprising at least one organic diluent (paragraph 0043); **(26)** wherein the organic diluent comprises 3-ethyl-3-hydroxymethyl-oxetane (paragraph 0043);

(27) wherein the epoxy monomer comprises a cycloaliphatic epoxy monomer, an aliphatic epoxy monomer, an aromatic epoxy monomer, a silicone epoxy monomer or combinations thereof (paragraphs 0013-0024);

(28) wherein the alkyl onium cure catalyst comprises an alkyl sulfonium cure catalyst (paragraph 0032); and

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(31) wherein the cured formulation provided a coefficient of thermal expansion of below about 70 pm/°C (paragraph 0012).

Claim Rejections - 35 USC § 102/103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 14 and 16 are rejected under 35 U.S.C. 102(n) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Crivello (US Pat. No. 6,210,790).

Regarding claims 14 and 16, Crivello does not explicitly disclose: (14) wherein the cured formulation provides a coefficient of thermal expansion below about 70 ppm/°C; and (16) wherein the cured formulation provides an optical transmission of at least about 80% at 400 nanometers. However, it has been found that "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that these limitations would have been inherently present in the teachings of Crivello.

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6. Claims 16 and 33 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Campbell et al. (Pub. No. US 2004/0102529 A1).

Regarding claims 16 and 33, Campbell et al. do not explicitly disclose: *(16 & 33)* wherein the cured formulation provides an optical transmission of at least about 80% at 400 nanometers. However, it has been found that "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that these limitations would have been inherently present in the teachings of Campbell et al.

Claim Rejections - 35 USC § 103

7. Claims 15 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (Pub. No. US 2004/0102529 A1) in view of Wensel (US Pat. No. 5,959,349).

Regarding claims 15 and 32, Campbell et al. disclose that their composition can be used in transfer molding applications for forming electronic encapsulated materials (paragraphs 0012 and 0048-0049); however, they do not explicitly disclose *(15 & 32)* wherein the optional reagents comprise anti-oxidants, mold releasing additives, plasticizing additives, or combinations thereof.

Wensel et al. disclose, "By far the nits common manner of forming a plastic package about a semiconductor device assembly is molding and, more specifically, transfer molding,"

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(column 1, lines 60-62), wherein, “The thermosetting polymer generally is comprised of three major components: an epoxy resin, a hardener (including accelerators), and a filler material.

Other additives such as flame retardants, *mold release agents* and colorants are also employed in relatively small amounts,” (column 2, lines 13-21). The teachings of Wensel et al. demonstrate that *mold release agents* are recognized in the art as suitable additives for epoxy resin compositions used to encapsulate a semiconductor device via transfer molding. In light of this, it has been found that the selection of a known material based on its suitability for its intended supports a *prima facie* obviousness determination – see *MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a mold release agent, as taught by Wensel et al., in the transfer molding composition of Campbell et al. because Wensel et al. demonstrate that mold release agents are recognized in the art as suitable additives for epoxy resin compositions used to encapsulate semiconductor devices via transfer molding.

Allowable Subject Matter

8. Claims 17 and 34 are allowed.
9. Claims 12, 13, 29, and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 17 and 34, Campbell et al. is the closest prior art; however they fail to teach or suggest a combination of: (a) an epoxy monomer, (b) phenyltrimethoxysilane functionalized colloidal silica, and (c) a cure catalyst comprising 3-methyl-2-butenyltetramethylene sulfonium hexafluoroantimonate. They teach the use of sulfonium catalysts, but they are silent regarding 3-methyl-2-butenyltetramethylene sulfonium hexafluoroantimonate.

Regarding claims 12, 13, 29, and 30, Campbell et al. is the closest prior art. They disclose the use of sulfonium catalysts; however they are silent regarding the use of 3-methyl-2-butenyltetramethylene sulfonium hexafluoroantimonate or substituted aryl-dialkyl sulfonium hexafluoroantimonate.

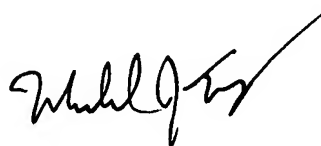
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Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael J. Feely
Patent Examiner
Art Unit 1712

February 20, 2005